

## APPENDIX A1. PRESS RELEASES

Jan. 4, 2005 RELEASE: 05-002

### **NASA WILL OPERATE TRMM SATELLITE THROUGH SPRING 2005**

NASA will continue to operate the Tropical Rainfall Measuring Mission (TRMM) spacecraft through spring 2005.

TRMM has yielded significant scientific research data over the past seven years to users around the globe, four years beyond its original design life. TRMM data has aided the National Oceanic and Atmospheric Administration (NOAA) and other users in their scientific research, understanding of rainfall and storm prediction, and by demonstrating its benefits in operational forecasts.

The extension followed release of interim report recommendations today from the National Academy of Science's (NAS) Committee on the Future of the Tropical Rainfall Measuring Mission. The Committee "strongly recommended continued operation of TRMM, at least until such time as a decision on controlled reentry becomes unavoidable."

NASA and NOAA asked the NAS last summer to convene a workshop to advise on the best use of TRMM's remaining spacecraft life; the overall risks and benefits of the TRMM mission extension options; the advisability of transfer of operational responsibility for TRMM to NOAA; any requirement for a follow-on operational satellite to provide comparable TRMM data; and optimal use of Global Precipitation Measurement mission, a follow-on research spacecraft to TRMM, planned for launch at decade's end. The ad hoc expert NAS Committee will issue a final report next summer.

"NASA recognizes the sustained value of TRMM data to the community and appreciates the Academy's thorough and thoughtful consideration of the future of this mission," said Deputy Associate Administrator for Science of NASA's Science Mission Directorate, Dr. Ghassem Asrar. "With this additional mission extension, however, we continue to be vigilant in maintaining our requirement for an eventual safe, controlled re-entry and deorbit of the spacecraft," he said.

Launched in 1997, TRMM was originally designed as a three-year research mission. Following four years of extending TRMM, NASA and its mission partner, the Japan Aerospace Exploration Agency, planned to decommission TRMM and proceed with a safe, controlled deorbit. NASA's extension of TRMM last fall ensured observations through the hurricane season. The extension accommodated a request from NOAA.

For more information about TRMM on the Web, visit:

<http://trmm.gsfc.nasa.gov/> For information about NASA and Agency programs on the Web, visit:

<http://www.nasa.gov>

Jan. 27, 2005 RELEASE: 05-029

## **INTERNATIONAL SCIENCE TEAM MEASURES ARCTIC'S ATMOSPHERE**

An international team of scientists embarked this week on a journey to improve modeling of global-scale air quality and climate change predictions by conducting high quality measurements of the Arctic region's atmosphere.

The Polar Aura Validation Experiment (PAVE) will gather information to validate data from NASA's Aura satellite, launched in July 2004. PAVE is the third in a series of planned Aura validation and science missions. These missions will help understand the transport and transformation of gases and aerosols in the lower atmosphere (troposphere), and their exchange with those in the lower stratosphere, the layer just above the troposphere. PAVE takes place from Jan. 24 to Feb. 9.

"In addition to providing important validation for the various Aura data products, PAVE brings together a full NASA complement of space-based and suborbital measurements to study the atmospheric chemistry and transport of gases and aerosols in this sensitive region of our planet," said Dr. Michael Kurylo, Program Scientist for PAVE, at NASA Headquarters in Washington. "The information from this campaign will aid in understanding how changing atmospheric composition, associated with climate change, might affect the recovery of the Earth's ozone layer that is anticipated to occur over the next several decades," he said.

In particular, PAVE focuses on the Arctic region of the Northern Hemisphere, where winter chemistry has led to significant seasonal reduction of the stratospheric ozone layer in many years, over more than a decade. The ozone layer restricts the amount of the sun's ultraviolet radiation that reaches the Earth. Depletion of this protective layer can have harmful effects on humans and other ecosystems.

NASA's DC-8 flying laboratory and high-altitude balloons are collecting valuable science data, especially on ozone and ozone-destroying chemicals, using a suite of atmospheric remote sensing and "in situ" instruments. The aircraft, operated by NASA's Dryden Flight Research Center, Edwards, Calif., is flying the PAVE mission from Pease International Tradeport, Portsmouth, N.H. Balloons are being launched from the European Sounding Rocket Range (ESRANGE) facility in Sweden.

The study is focusing on obtaining in situ and remote sensing measurements of the arctic region for validation of the Aura satellite. Information gathered during PAVE will be combined with data from Aura to improve modeling of global-scale air quality, ozone and climate change predictions.

Instruments on board the DC-8 are characterizing upper tropospheric and stratospheric gases inside and outside the Arctic polar region to study ozone depletion chemistry. Such flights also permit measurement of the outflow of gases from the North American continent, thereby contributing to an understanding of how regional pollutants are distributed in the hemisphere.

Scientists will make remote sensing measurements (extending many kilometers away from the aircraft) of tropospheric and stratospheric ozone, aerosols, temperature, nitric acid, HCl, ClO and other ozone-related chemicals. These are complemented by measurements of components such as ozone, methane, water vapor, carbon monoxide, nitric acid and nitrous oxide, in the atmosphere immediately surrounding the aircraft.

Major PAVE partners include the University of New Hampshire, Durham; University of California-Berkeley; University of Bremen, Germany; National Center for Atmospheric Research (NCAR), Boulder, Colo.; the U.S. Naval Research Laboratory in Washington; Koninklijk Netherlands Meteorological Institute; and Los Gatos Research, Inc., Mountain View, Calif.

For more information about the Aura mission on the Internet, visit:

<http://aura.gsfc.nasa.gov/> For more information about PAVE on the

Internet, visit: <http://cloud1.arc.nasa.gov/ave-polar/>

May 20, 2005 RELEASE: 05-129

## NASA SUCCESSFULLY LAUNCHES ENVIRONMENTAL SATELLITE

NASA successfully launched a new environmental satellite today for the National Oceanic and Atmospheric Administration (NOAA). It will improve weather forecasting and monitor environmental events around the world.

The NOAA-18 (N) spacecraft lifted off at 6:22 a.m. EDT from Vandenberg Air Force Base, Calif., on a Boeing Delta II 7320-10 expendable launch vehicle. Approximately 65 minutes later, the spacecraft separated from the Delta II second stage.

“The satellite is in orbit and all indications are that we have a healthy spacecraft,” said Karen Halterman, the NASA Polar-orbiting Operational Environmental Satellites (POES) Project Manager, Goddard Space Flight Center (GSFC), Greenbelt, Md. “NASA is proud of our partnership with NOAA in continuing this vital environmental mission,” she added.

Flight controllers tracked the launch vehicle’s progress using real-time telemetry data relayed through NASA’s Tracking and Data Relay Satellite System (TDRSS) starting about five minutes after launch. Approximately 26 minutes after launch, controllers acquired the spacecraft through the McMurdo Sound ground station, Antarctica, while the spacecraft was still attached to the Delta II. Spacecraft separation was monitored by the TDRSS.

The solar array boom and antennas were successfully deployed, and the spacecraft was placed in a near-perfect orbit. The satellite was acquired by the NOAA Fairbanks Station, Alaska, 86 minutes after launch and deployments, and a nominal spacecraft power system was confirmed. NOAA-N was renamed NOAA-18 after achieving orbit.

NOAA-18 will collect data about the Earth’s surface and atmosphere. The data are input to NOAA’s long-range climate and seasonal outlooks, including forecasts for El Nino and La Nina. NOAA-18 is the fourth in a series of five Polar-orbiting Operational Environmental Satellites with instruments that provide improved imaging and sounding capabilities.

NOAA-18 has instruments used in the international Search and Rescue Satellite-Aided Tracking System, called COSPAS-SARSAT, which was established in 1982. NOAA polar-orbiting satellites detect emergency beacon distress signals and relay their location to ground stations, so rescue can be dispatched. SARSAT is credited with saving approximately 5,000 lives in the U.S. and more than 18,000 worldwide.

Twenty-one days after spacecraft launch, NASA will transfer operational control of NOAA-18 to NOAA. NASA’s comprehensive on-orbit verification period is expected to last approximately 45 days.

NOAA manages the POES program and establishes requirements, provides all funding and distributes environmental satellite data for the United States. GSFC procures and manages the development and launch of the satellites for NOAA on a cost-reimbursable basis.

NASA’s Kennedy Space Center, Fla., was responsible for the countdown management and launch of the Delta II, which was provided by Boeing Expendable Launch Systems, Huntington Beach, Calif.

For images of the launch, information about NOAA-N and the polar-orbiting satellites, visit:

<http://www.nasa.gov/noaa-n>

<http://goespoes.gsfc.nasa.gov>

<http://www.noaa.gov>

<http://nws.noaa.gov>

June 16, 2005 MEDIA ADVISORY: M05-098

### **NASA ANNOUNCES DANGEROUS WEATHER MEDIA CONFERENCE**

NASA hurricane researchers are available for a media teleconference at noon EDT, Thursday, June 23 to discuss the month-long Tropical Cloud Systems and Processes (TCSP) mission to Costa Rica.

TCSP starts July 1, and mission scientists expect to observe the genesis of some of the world's most dangerous weather formations in the Pacific Ocean. Five NASA centers, 10 American universities and the National Oceanic and Atmospheric Administration (NOAA) are participating.

For the call-in number, password, Internet site where graphics and other materials will be posted, reporters should call Tomeka Scales at: 202/358-0781, by 5 p.m. EDT, Wednesday.

Briefing Participants:

- Dr. Ramesh Kakar: Weather Focus Area leader for NASA's Science Mission Directorate
- **Dr. Gerry Heymsfield**: cloud radar expert and research meteorologist at NASA's Goddard Space Flight Center, Greenbelt, Md.
- Dr. Edward Zipser: chairman and professor of the Department of Meteorology at the University of Utah, Salt Lake City
- Dr. Frank Marks, director of the Hurricane Research Division for NOAA's Atlantic Oceanographic and Meteorological Laboratory, Miami

For information about TCSP on the Internet, visit:

[http://www.nasa.gov/vision/earth/lookingatearth/hurricane\\_2005.html](http://www.nasa.gov/vision/earth/lookingatearth/hurricane_2005.html)

or

<http://tcsp.nsstc.nasa.gov/tcsp/>

July 26, 2005 RELEASE: 05-199

## **NASA'S GOES-N SATELLITE READY FOR LAUNCH**

NASA announced the Geostationary Operational Environmental Satellite-N (GOES-N) is ready to launch. The GOES-N launch window is from 6:23 to 7:01 p.m. EDT, Friday, July 29, 2005. Liftoff is from Space Launch Complex 37, Cape Canaveral Air Force Station, Fla.

GOES-N joins a system of weather satellites that provide timely environmental information to meteorologists and the public. The GOES system graphically displays the intensity, path and size of storms. Early warning of impending severe weather enhances the public's ability to take shelter and protect property.

NASA is proud to provide this tool for the National Oceanic and Atmospheric Administration's (NOAA) use in weather operations," said Martin Davis. He is the GOES program manager at NASA's Goddard Space Flight Center (GSFC), Greenbelt, Md. The GOES system serves the central and eastern Pacific Ocean; North, Central, and South America; and the central and western Atlantic Ocean.

The system includes GOES-10, 11 and 12. GOES-11 is in an on-orbit storage mode. GOES-N becomes GOES-13 shortly after launch. It will be checked out, stored on-orbit and available for activation should either GOES-10 or 12 fails or exhausts its fuel. The satellite is the first in the GOES N-P series of spacecraft that will continuously observe and measure meteorological phenomena in real time. The series will provide the meteorological community and atmospheric scientists improved observational and measurement data.

GOES-N will be launched on a Boeing Delta IV (4, 2) vehicle under an FAA commercial license. The satellite will be turned over to NASA after a successful checkout is completed by Boeing Space and Intelligence Systems.

NOAA manages the GOES program, establishes requirements, provides all funding and distributes environmental satellite data for the United States.

GSFC procures and manages the development and launch of the satellites for NOAA on a cost reimbursable basis. GSFC also manages the design, development and launch of NOAA satellites. Boeing, acting as lead contractor, built GOES-N.

For more information about the GOES-N mission and program on the Web, visit:

<http://www.nasa.gov/goes-n>

<http://goespoes.gsfc.nasa.gov>

<http://www.noaa.gov/> For information about NASA and agency programs on the Web, visit:

<http://www.nasa.gov/home/index.html>

August 24, 2005 RELEASE: 05-231

### NASA/NOAA ANNOUNCE MAJOR WEATHER FORECASTING ADVANCEMENT

NASA and the National Oceanic and Atmospheric Administration (NOAA) today outlined research that has helped to improve the accuracy of medium-range weather forecasts in the Northern Hemisphere.

NASA and NOAA scientists at the Joint Center for Satellite Data Assimilation (JCSDA) in Camp Springs, Md., came up with procedures to improve forecasting accuracy. The scientists worked with experimental data from the Atmospheric Infrared Sounder (AIRS) instrument on NASA's Aqua satellite.

They found incorporating AIRS data into numerical weather prediction models improves the accuracy range of experimental six-day Northern Hemisphere weather forecasts by up to six hours, a four percent increase. AIRS is a high-spectral resolution infrared instrument that takes 3-D pictures of atmospheric temperatures, water vapor and trace gases.

The instrument data have officially been incorporated into NOAA's National Weather Service's operational weather forecasts.

"NASA is assisting the world's weather prediction agencies by providing very detailed, accurate observations of key atmospheric variables that interact to shape our weather and climate," said Dr. Mary Cleave, associate administrator for NASA's Science Mission Directorate. "The forecast improvement accomplishment alone makes the AIRS project well worth the American taxpayers' investment."

"This AIRS instrument has provided the most significant increase in forecast improvement in this time range of any other single instrument," said retired U.S. Navy Vice Adm. Conrad C. Lautenbacher, Jr., Ph.D., Undersecretary of Commerce for Oceans and Atmosphere and NOAA administrator.

"Climate and weather forecasts are dependent upon our understanding current global ocean and atmosphere conditions. If we want to be able to predict what the weather will be like in the future, we must adequately define the global conditions today. Satellite data, like AIRS provides, is a vital link for NOAA to continuously take the pulse of the planet."

"A four percent increase in forecast accuracy at five or six days normally takes several years to achieve," said JSCDA Director, Dr. John LeMarshall. "This is a major advancement, and it is only the start of what we may see as much more data from this instrument is incorporated into operational forecast models at NOAA's Environmental Modeling Center."

The European Center for Medium Range Weather Forecasts began incorporating data from AIRS into their operational forecasts in October 2003. The center reported an improvement in forecast accuracy of eight hours in Southern Hemisphere five-day forecasts.

AIRS is the result of more than 30 years of atmospheric research. It is led by Dr. Moustafa Chahine of NASA's Jet Propulsion Laboratory, Pasadena, Calif. AIRS is the first in a series of advanced infrared sounders that will provide accurate, detailed atmospheric temperature and moisture observations for weather and climate applications.

The JCSDA is operated by NOAA, NASA, the U.S. Air Force and Navy. The goals of the center are to accelerate the use of observations from Earth-orbiting satellites to improve weather and climate forecasts, and to increase the accuracy of climate data sets.

For information about AIRS on the Internet, visit:

<http://airs.jpl.nasa.gov/>

For information about NASA and agency programs on the Internet, visit:

<http://www.nasa.gov/home/index.html>

August 26, 2005 STATUS REPORT: E05-009

**NASA EXPENDABLE LAUNCH VEHICLE STATUS REPORT: E05-009**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/CloudSat) Launch Vehicle: Boeing Delta 7420 w/Dual Payload Attach Fitting (DPAF) Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base, Calif. Launch Date: NET, September 29, 2005

The CloudSat spacecraft was fueled Aug. 14 and the fuel tanks pressurized Aug. 15; CALIPSO was fueled Aug. 24 and the fuel tanks pressurized Aug. 25. CloudSat was mated to the DPAF Aug 23. Installation of the upper half of the DPAF for CALIPSO was completed today. The CALIPSO Mission Readiness Review was today. The CloudSat Mission Readiness Review is scheduled for Thursday, Sept. 1.

As a part of the NASA Earth System Science Pathfinder program, CALIPSO is a collaborative effort with the French space agency Centre National d'Etudes Spatiales, Ball Aerospace, Hampton University, Va. and France's Institut Pierre Simon Laplace.

Ball Aerospace is responsible for CALIPSO's scientific instrument and communications suite, including the lidar and Wide Field Camera. NASA's Launch Services Program at KSC provides government launch services for this mission through Boeing Expendable Launch Systems.

Previous status reports are available on the Web at:

<http://www.nasa.gov/centers/kennedy/launchingrockets/status/2005> For information about NASA and agency programs on the Web, visit:

<http://www.nasa.gov/home/index.html>

September 2, 2005 RELEASE: 05-246

### **NASA'S SCIENCE RESOURCES HELP AGENCIES RESPOND TO KATRINA**

NASA science instruments and Earth-orbiting satellites are providing detailed insight about the environmental impact caused by Hurricane Katrina. Images and data are helping characterize the extent of flooding; damage to homes, businesses and infrastructure; and potential hazards caused by the storm and its aftermath.

NASA, along with academic institutions and partner agencies, is working to ensure the Department of Homeland Security and the Federal Emergency Management Agency (FEMA) have the best available information to aid in responding to this catastrophic event.

NASA's partner agencies in this endeavor include the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the National Geospatial Intelligence Agency, the Environmental Protection Agency, and the U.S. Department of Agriculture.

Coordinated assistance by numerous academic institutions and laboratories working under NASA grants will be employed by the Gulf Coast relief and recovery efforts to provide geospatial information useful to first responders and decision makers.

NASA aircraft are providing detailed observations of the disaster area. The aircraft are taking high-resolution observations that can be used to assess the amount of damage to communities and the environment. For example at the request of USGS in cooperation with FEMA and the Army Corps of Engineers, NASA's Experimental Advanced Airborne Research LIDAR (EAARL) system is surveying the gulf coastline.

The EAARL system, carried on a Cessna 310, surveyed the northern gulf coastline on Thursday. Tomorrow the aircraft is scheduled to fly over the perimeter and surrounding levee around New Orleans to assist in damage assessment of the system.

While making its observations of the land, EAARL has the ability to "see" through vegetation, like trees and shrubs, to view the land underneath. Near the coast it can map the beach surface under water. This will help in the recovery of the shoreline infrastructure; determine hazard areas and environmental loss.

The Terra, Aqua and Tropical Rainfall Measuring Mission (TRMM) satellites have already provided Earth observations for land cover and rainfall. Terra's Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) is providing data on the magnitude and extent of damage and flooding to the USGS Emergency Response Team through its Earth Resources Observation Systems Data Center in Sioux Falls, S.D.

NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on the Terra and Aqua satellites provided images of flooding, pre and post disaster comparisons. Data from NASA's QuikScat satellite was one source of wind observations used by NOAA's Hurricane Research Division to analyze the wind field of the storm and to track its path.

Another NASA satellite in use is the Earth Observing Mission 1 (EO-1). The Advanced Land Imagery (ALI) multispectral instrument on EO-1 provided land use and land cover observations useful in determining hurricane damage areas and in aiding in recovery, response and mitigation.

NASA satellites are used to improve weather predictions, to study climate and natural hazards. The knowledge gained during these missions aids assessment and recovery operations.

For satellite images and additional information on the Web, visit:

<http://www.nasa.gov/hurricane>

[http://www.aoml.noaa.gov/hrd/Storm\\_pages/katrina2005/wind.html](http://www.aoml.noaa.gov/hrd/Storm_pages/katrina2005/wind.html). For information about NASA and agency programs on the Web, visit:

<http://www.nasa.gov/home>

September 15, 2005 RELEASE: 05-261

## NASA SATELLITES WILL REVEAL SECRETS OF CLOUDS AND AEROSOLS

Two NASA satellites, planned for launch no earlier than Oct. 26, will give us a unique view of Earth's atmosphere. CloudSat and Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) are undergoing final preparations for launch from Vandenberg Air Force Base, Calif.

CloudSat and CALIPSO will provide a new, 3-D perspective on Earth's clouds and airborne particles called aerosols. The satellites will answer questions about how clouds and aerosols form, evolve and affect water supply, climate, weather and air quality.

CloudSat and CALIPSO employ revolutionary tools that will probe Earth's atmosphere. Each spacecraft carries an "active" instrument that transmits pulses of energy and measures the portion of the pulses scattered back to the instrument.

CloudSat's cloud-profiling radar is more than 1,000 times more sensitive than typical weather radar. It can detect clouds and distinguish between cloud particles and precipitation. "The new information from CloudSat will answer basic questions about how rain and snow are produced by clouds, how rain and snow are distributed worldwide and how clouds affect the Earth's climate," said Dr. Graeme Stephens, CloudSat principal investigator at Colorado State University, Fort Collins, Colo.

CALIPSO's polarization lidar instrument can detect aerosol particles and can distinguish between aerosol and cloud particles. "With the high resolution observation that CALIPSO will provide, we will get a better understanding of aerosol transport and how our climate system works," said Dr. David Winker, CALIPSO principal investigator at NASA's Langley Research Center, Hampton, Va.

The satellites will be launched into a 438-mile circular, sun-synchronous polar orbit, where they will fly in formation just 15 seconds apart as members of NASA's "A-Train" constellation with three other Earth Observing System satellites. The A-Train includes NASA's Aqua and Aura satellites and France's PARASOL satellite.

The usefulness of data from CloudSat, CALIPSO and the other A-Train satellites will be much greater when combined. The combined set of measurements will provide new insight into the global distribution and evolution of clouds that will lead to improvements in weather forecasting and climate prediction.

CloudSat is managed by NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif. The radar instrument was developed at JPL, with hardware contributions from the Canadian Space Agency. Colorado State University provides scientific leadership and science data processing and distribution.

Other contributions include resources from the U.S. Air Force and the U.S. Department of Energy. Ball Aerospace and Technologies Corp. designed and built the spacecraft. A host of U.S. and international universities and research centers provides support to the science team. Some of these activities are contributed as partnerships with the project.

CALIPSO was developed through collaboration between NASA and the French Space Agency, *Centre National d'Etudes Spatiales* (CNES). NASA's Langley Research Center leads the CALIPSO mission and provides science team leadership, systems engineering, payload mission operations, and validation, processing and archiving of data. Langley also developed the lidar instrument in collaboration with the Ball Aerospace and Technologies Corp., which developed the onboard visible camera.

NASA's Goddard Space Flight Center, Greenbelt, Md., provides project management, system engineering support and overall program management. CNES provides a PROTEUS spacecraft developed by Alcatel, the imaging infrared radiometer, payload-to-spacecraft integration and spacecraft mission operations. The Institut Pierre Simon Laplace in Paris provides the imaging infrared radiometer science oversight, data validation and archival. Hampton University provides scientific contributions and manages the outreach program.

For more information on CloudSat and CALIPSO on the Internet, please visit:

<http://www.nasa.gov/cloudsat> and <http://www.nasa.gov/calipso> WIA will present the awards during a public reception at the Rayburn House Office Building Foyer from 6 to 8 p.m. WIA will present three other awards at the reception, the Outstanding Leadership Award, the Aerospace Awareness Award, and the Aerospace Educator Award, to women who work in the private sector. WIA is a non-profit organization dedicated to expanding women's opportunities for leadership and increasing their visibility in the aerospace community.